REMARKS

The applicant respectfully requests reconsideration in view of the following remarks. The applicant deleted the title from the abstract. Support for the amended claims to exclude polyphosphoric acid can be found in the specification at page 5, lines 6-9. The applicant has changed all the product by process claims to process claims. The applicant has added one product by process claim (claim 34).

The applicant has added one claim (claim 34) and cancelled one claim (claim 30). The applicant has changed one independent claim (claim 26) to a dependent claim and one dependent claim (claim 29) to an independent claim. No fee is required for the amendment to the claims.

Claim 4 is objected to under 37 CFR 1.175(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Claims 10, 12, 18, 19, 24, 27 and 29-33 are rejected under 35 U.S.C. 112, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 1-4, 7, 9, 10, 20, and 23 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 39, 40, 46-48, 55, 61, 62, and 70 of US 7,384,552 B2 ('552 patent). Claim 20 is rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 20 of US 7,582,210 B2 ('210 patent). Claims 1-3, 5-10, and 20 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-3, 5, 7, 9, 11, 15, 17, 18, and 23 of US 7,540,984 B2 ('984 patent). Claims 1-4, 7, 9, 10, 20 and 23 are rejected under 35 U.S.C. 102(a) as being anticipated by DE 101117686 (Calundann et al.) (U.S. 7,384,552 is being used by the Examiner as the translation). Claims 1-4, 6-10, 18, 19, 24, 29, 30, and 32 are rejected under 35 U.S.C. 102(b) as being anticipated by US 4,312,976 (Choe). Claims 1, 5, and 15 are rejected under 35 U.S.C. 103(a) as

being unpatentable over US 4,154,919 (Sheratte) in view of Choe. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Choe in view of US 5,409,524 (Jensvold et al.). Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Choe in view of US 4,020,142 (Davis et al.). Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Choe in view of US 6,151,042 (Smith et al.). Claims 1, 12, 13, 20-23, and 25-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Choe in view of US 5,017,681 (Wadhwa et al.). Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Choe in view of Wadhwa et al., and further in view of *Acid-Doped Polybenzimidazoles: A New Polymer Electrolyte* (Wainright et al.), and Sheratte. Claim 31 is rejected under 35 U.S.C. 103(a) as being unpatentable over Choe in view of US 4,810,730 (Letinski et al.) and Sheratte. The applicant respectfully traverses these rejections.

Formal objection

Claim 4 is objected to under 37 CFR 1.175(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Claim 4 has been amended to overcome this objection. For the above reasons, this objection should be withdrawn.

Rejections under 35 U.S.C. 112

Claims 10, 12, 18, 19, 24, 27 and 29-33 are rejected under 35 U.S.C. 112, second paragraph as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The applicant has amended the claims and believes that the claims as amended are in compliance with 35 U.S.C. 112, second paragraph. For the above reasons, this rejection should be withdrawn.

Double Patenting Rejections

Claims 1-4, 7, 9, 10, 20, and 23 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 39, 40, 46-48, 55, 61, 62, and 70 of the '552 patent. Claim 20 is rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 20 of the '210 patent. Claims 1-3, 5-10, and 20 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-3, 5, 7, 9, 11, 15, 17, 18, and 23 of the '984 patent.

Claim 39 of the '552 patent states:

> 39. A proton-conducting polymer membrane based on polyazoles which is obtained by a process comprising the steps A) Mixing of one or more aromatic tetraamino compounds with one or more aromatic carboxylic acids or esters thereof which contain at least two acid groups per carboxylic acid monomer, or mixing of one or more aromatic and/or heteroaromatic diaminocarboxylic acids**, in polyphosphoric acid** to form a solution and/or dispersion, B) Heating of the mixture in step A) to temperatures of up to 350^0 C. under inert gas to form the polyazole polymer, C) Application of a layer to a support using the mixture from step B), D) Treating the polyazole polymer formed in step B) by hydrolysis of the layer from step C) until it is self-supporting. (emphasis added)

There are several differences between the applicant's claimed invention and the claims of the '552 patent. One difference, is that all the claims in the '552 patent require mixing in **poly**phosphoric acid, while the applicant's claimed invention requires mixing in phosphoric acid and excludes the use of a polyphosphoric acid in the process step. Therefore, the applicant does not believe that there is any overlap in the process claims. For the above reasons, this rejection should be withdrawn.

Claim 1 of the '210 patent states:

> 1. An electrode provided with a proton-conducting polymer coating based on polyazoles which is obtained by a process comprising the steps (A) Mixing of one or more aromatic tetraamino compounds with one or more aromatic carboxylic acids or esters thereof which contain at least two acid groups per carboxylic acid monomer, or mixing of one or more aromatic and/or heteroaromatic diaminocarboxylic acids, **in polyphosphoric acid** to form a solution and/or dispersion, (B) Application of a layer to an electrode using the mixture from step A), (C) Heating of the flat structure/layer obtainable as described in step B) to temperatures of up to 350^0 C. under inert gas to form the polyazole polymer, (D) Treating the membrane formed in step C) by hydrolysis. (emphasis added)

There are several differences between the applicant's claimed invention and the claims of the '210 patent. One difference, is that all the claims in the '210 patent, like the '552 patent require mixing in **poly**phosphoric acid, while the applicant's claimed invention requires mixing in phosphoric acid and not a polyphosphoric acid. The applicant's claimed invention excludes the use of a polyphosphoric acid in the process step. Therefore, the applicant does not believe that there is any overlap in the process claims. For the above reasons, this rejection should be withdrawn.

Claim 1 of the '984 patent states:

> 1. A process for preparing a membrane which comprises process (1) or process (2), wherein the process of (1) comprises A1) mixing of one or more aromatic tetraamino compounds with one or more aromatic carboxylic acids or esters thereof which contain at least two acid groups per carboxylic acid monomer, or mixing of one or more aromatic and/or heteroaromatic diaminocarboxylic acids, in **polyphosphoric acid** to form a solution and/or dispersion, B1) application of a layer to a support

> using the mixture from step A1), C1) heating of the flat structure/layer obtained as described in step B1) to temperatures of up to 350^0 C. under inert gas to form the polyazole polymer, D1) treating the membrane formed in step C1) by hydrolysis until it is self-supporting, or wherein the process of (2) comprises A2) mixing of one or more aromatic tetraamino compounds with one or more aromatic carboxylic acids or esters thereof which contain at least two acid groups per carboxylic acid monomer, or mixing of one or more aromatic and/or heteroaromatic diaminocarboxylic acids, in polyphosphoric acid to form a solution and/or dispersion, B2) heating of the mixture in step A2) to temperatures of up to 350^0 C. under inert gas to form the polyazole polymer, C2) application of a layer to a support using the polymer from step B2), D2) treating the membrane formed in step C2) by hydrolysis until it is self-supporting. (emphasis added)

There are several differences between the applicant's claimed invention and the claims of the '984 patent. One difference, is that all the claims in the '984 patent, like the '210 and '552 patents, require mixing in **poly**phosphoric acid, while the applicant's claimed invention requires mixing in phosphoric acid and not a polyphosphoric acid. Again, the applicant's claimed invention excludes the use of a polyphosphoric acid in the process step. Therefore, the applicant does not believe that there is any overlap in the process claims. For the above reasons, this rejection should be withdrawn.

Rejection Over Calundann

Claims 1-4, 7, 9, 10, 20 and 23 are rejected under 35 U.S.C. 102(a) as being anticipated by Calundann. Calundann describes a process which requires the use of monomers that are suspended or dissolved in **polyphosphoric** acid in step A. The applicant's claimed invention requires the use of phosphoric acid and specifically excludes polyphosphoric acid. Therefore, Calundann not only does not anticipate the claims but actually teaches away from the applicant's claimed invention.

In addition, the applicant has submitted an English certified translation of their priority document. The applicant believes that this application now has a filing date prior to Calundann. Therefore, Calundann is not prior art. For the above reasons, this rejection should be withdrawn.

Rejection Over Choe

Claims 1-4, 6-10, 18, 19, 24, 29, 30, and 32 are rejected under 35 U.S.C. 102(b) as being anticipated by Choe. Choe discloses a process for the manufacture of PBI (Polybenzimidazole) resins by a single stage melt polymerization starting from the same monomers as the applicant's invention does. Choe discloses that the PBI resin can also be obtained by polymerization with polyphosphoric acid (PPA) (see col. 1, lines 31-44). Again, the applicant's claimed invention excludes the use of PPA.

Hence, Choe is silent of (i) any proton conductive membranes and the applicant's claimed process to make a proton conductive membrane, and (ii) any process using PPA-free phosphoric acid. Therefore, this rejection should be withdrawn.

Rejections under 35 U.S.C. 103(a)

Claims 1, 5, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Sheratte in view of Choe. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Choe in view of Jensvold. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Choe in view of Davis. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Choe in view of Smith. Claims 1, 12, 13, 20-23, and 25-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Choe in view of Wadhwa. Claim 11 is rejected under 35

U.S.C. 103(a) as being unpatentable over Choe in view of Wadhwa and further in view of Wainright and Sheratte. Claim 31 is rejected under 35 U.S.C. 103(a) as being unpatentable over Choe in view of Letinski and Sheratte.

Choe is a reference relied upon for each rejection. As stated above, Choe is silent of (i) any proton conductive membranes and the applicant's claimed process to make a proton conductive membrane, and (ii) any process using PPA-free phosphoric acid.

In order to render the applicant's claimed invention obvious, the Examiner combines Sheratte in view of Choe. However, like Choe, there is no teaching provided by Sheratte directed to (i) any proton conductive membranes and the applicant's claimed process to make a proton conductive membrane, and (ii) any process using PPA-free phosphoric acid. Hence even combining Sheratte with Choe does not render the applicant's claimed invention obvious.

In order to render claim 14 obvious, the Examiner combines Choe with Jensvold. Jensvold relates to gas separation membranes, inter alia, based on polyazoles (see col. 1, lines 7-10, and col. 2, lines 63ff). However, there is no teaching provided by Jensvold directed to (i) any proton conductive membranes and the applicant's claimed process to make a proton conductive membrane, and (ii) any process using PPA-free phosphoric acid.

Therefore, the combination of Choe in view of Jensvold does not render the applicant's claimed invention obvious.

In order to render claim 16 obvious, the Examiner combines Choe with Davis. The Examiner stated at page 20 of the Office Action that Choe does not specifically teaches that membrane produced in step C) is crosslinked by treatment with sulfuric acid in step D). Davis

relates to semi permeable membranes for ultra filtration, inter alia, based on polybenzimidazoles (see the abstract). It is recognized that Davis states

> The strong polybasic acid which is utilized in the present process may be a carboxylic acid, a sulfonic acid, sulfuric acid or phosphoric acid. Also, polybasic sulfinic, phosphinic, and phosphonic acids may be selected. The strong polybasic organic acids may include functional groups other than the required plurality of acid groups, e.g., halogens which do not interfere with the desired cross-linking reaction. Acid halides of such strong polybasic acids, e.g., acid chlorides, likewise may be selected. Mixtures of strong polybasic acids and/or acid halides of the same may be utilized. When an acid chloride is utilized the polybenzimidazole tends to be covalently cross-linked, otherwise the cross-linking tends to be ionic in nature.

However, none of the examples use phosphoric acid. Phosphoric acid is only one several different polybasic acids disclosed. However, there is no teaching provided by Davis to (i) any proton conductive membranes, and (ii) any process using PPA-free phosphoric acid.

Therefore, the combination of Choe in view of Davis does not render the applicant's claimed invention obvious.

In order to render claim 17 obvious, the Examiner combines the Choe reference with Smith. Smith relates to cross-linking of photosensitivity imparting substituent in polymers, inter alia, based on polybenzimidazoles (see Abstract). However, there is no teaching provided by Smith directed to (i) any proton, conductive membranes, and (ii) any process using PPA-free phosphoric acid.

Therefore, the combination of Choe in view of Smith does not render the applicant's claimed invention obvious.

In order to render claims 1, 12, 13, 20-23, and 25-27 obvious, the Examiner combines the Choe with Wadhwa. Wadhwa relates to a process for casting polymer films based on

polybenzimidazoles (see Abstract). The process taught uses solutions of PBI in various solvent, including certain acids (see col. 4, lines 15 to 27, in particular lines 25 to 27).

There is no teaching in Wadhwa to use phosphoric acid nor is any teaching provided to perform the polymerization in phosphoric acid. The solvents used are removed by washing with "non-solvent" liquids, hence no acid remains.

As one of ordinary skill in the art can easily determine, there is no teaching provided by Wadhwa directed to (i) any proton conducive membranes, and (iii) any process using PPA-free phosphoric acid.

Therefore, the combination of Choe in view of Wadhwa does not render the applicant's claimed invention obvious.

In order to render claim 31 as obvious, the Examiner combines the Choe reference with Letinski and Sheratte. Letinski relates to a process for producing high strength filaments based on polybenzimidazoles for making foamed articles there from (see Abstract). The process taught uses solutions of PBI in various solvent, including certain acids (see col. 4, lines 55 to 68, in particular lines 65 to 68). There is no teaching to use phosphoric acid nor is any teaching provided to perform the polymerization in phosphoric acid. The solvents used are removed by heating and foaming/molding the shaped articles.

There is no teaching provided by Letinski directed to (i) any proton conductive membranes, and (ii) any process using PPA-free phosphoric acid.

Therefore, the combination of Choe in view of Letinski and Sheratte does not render the applicant's claimed invention obvious.

In order to render claim 11 obvious, the Examiner combines the Choe in view of Wadhwa and further in view of Wainright and Sheratte. The applicant has already discussed the deficiencies in Choe, Wadhwa and Sheratte. The applicant does not believe that Wainright cures these deficiencies.

A statement that modifications of the prior art to meet the claimed invention would have been "obvious to one of ordinary skill in the art at the time the invention was made" because the references relied upon teach that all aspects of the claimed invention were individually known in the art is not sufficient to establish a *prima facie* case of obviousness without some objective reason to combine the teachings of the references. *Ex parte Levengood*, 28 USPQ2d 1300 (Bd. Pat. App. & Inter. 1993). See MPEP § 2143.01 IV. "[R]ejections on obviousness cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness." *KSR International Co. v. Teleflex Inc.*, 82 USPQ2d 1385, 1396 (2007) quoting *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006). Furthermore, the Examiner cannot selectively pick and choose from the disclosed parameters without proper motivation as to a particular selection. The mere fact that a reference may be modified to reflect features of the claimed invention does not make the modification, and hence the claimed invention, obvious unless the prior art suggested the desirability of such modification. *In re Mills*, 916 F.2d 680, 682, 16 USPQ2d 1430 (Fed. Cir. 1990); *In re Fritch*, 23 USPQ2d 1780 (Fed. Cir. 1992). Thus, it is impermissible to simply engage in a hindsight reconstruction of the claimed invention where the reference itself provides no teaching as to why the applicant's combination would have been obvious. *In re Gorman*, 933 F.2d 982, 987, 18 USPQ2d 1885, 1888 (Fed. Cir. 1991).

In summary, the instant invention is not obvious over Choe either taken alone or in combination with the aforementioned other references. For the above reasons, these rejections should be withdrawn.

In view of the above amendment, applicant believes the pending application is in condition for allowance.

Applicant has paid a two month extension of time. Applicant believes no fee is due with this response. However, if a fee is due, please charge our Deposit Account No. 03-2775, under Order No. 15588-00011-US from which the undersigned is authorized to draw.

Dated: February 11, 2010

Respectfully submitted,

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